Modular Spray-Cooled Assemblies for High Heat Fluxes, Phase II

Completed Technology Project (2005 - 2007)

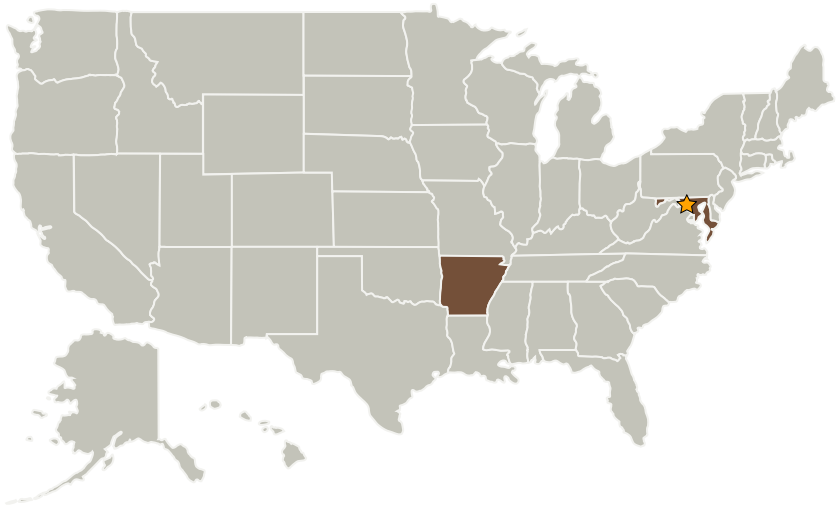
Project Introduction

This NASA SBIR Phase II project will produce a flight suitable test bench based on a modular spray-cooled assembly that considers NASA power and mass budgets and can be scaled to cool multiple heat sources producing high heat fluxes under gravity and microgravity conditions. Thermal management solutions for certain NASA applications like laser diodes are not all that suitable with a need for a better solution. PELS in a NASA SBIR Phase I project developed a modular assembly based on spray cooling under phase change achieving heat fluxes approaching 100 W/cm2 per evaporator using Fluorinert

TM

(FC-72) as the cooling liquid. This was possible because of PELS novel fluid removal approach. This Phase II project builds upon the improvements in spray cooling performance by bringing improvements in the packaging to achieve volume and weight gains at the system level so spray cooling can become the standard thermal management solution. The terminal objectives of this SBIR Phase II project are (a) To optimize the design of the modular spray-cooled assembly demonstrated in the SBIR Phase I project, and (b) To extend this design to cool multiple heat sources subjected to heat fluxes approaching 200 W/cm2 under microgravity conditions.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Power Electronics Leveling Solutions LLC	Supporting Organization	Industry	Fayetteville, Arkansas

Primary U.S. Work Locations	
Arkansas	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.3 Heat Rejection and Storage